Interoperability Issues for Digitisation Projects

as identified by the

EC working group on DL interoperability

and EDLnet project WP2

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Overview

- Interoperability **framework** from EC working group and ongoing work within EDLnet
  - Working Group **context, methodology** and selected **interoperability frameworks**
  - Interoperability WG and **EDLnet WP2**
  - **10 DL Interoperability Short Term Agenda Issues**
  - Long Term **Strategy Elements**
  - Evolution of **Object Models**
- Specific **requirements** and **constraints** for **Digitisation Projects**

Interoperability WG Context + Mission

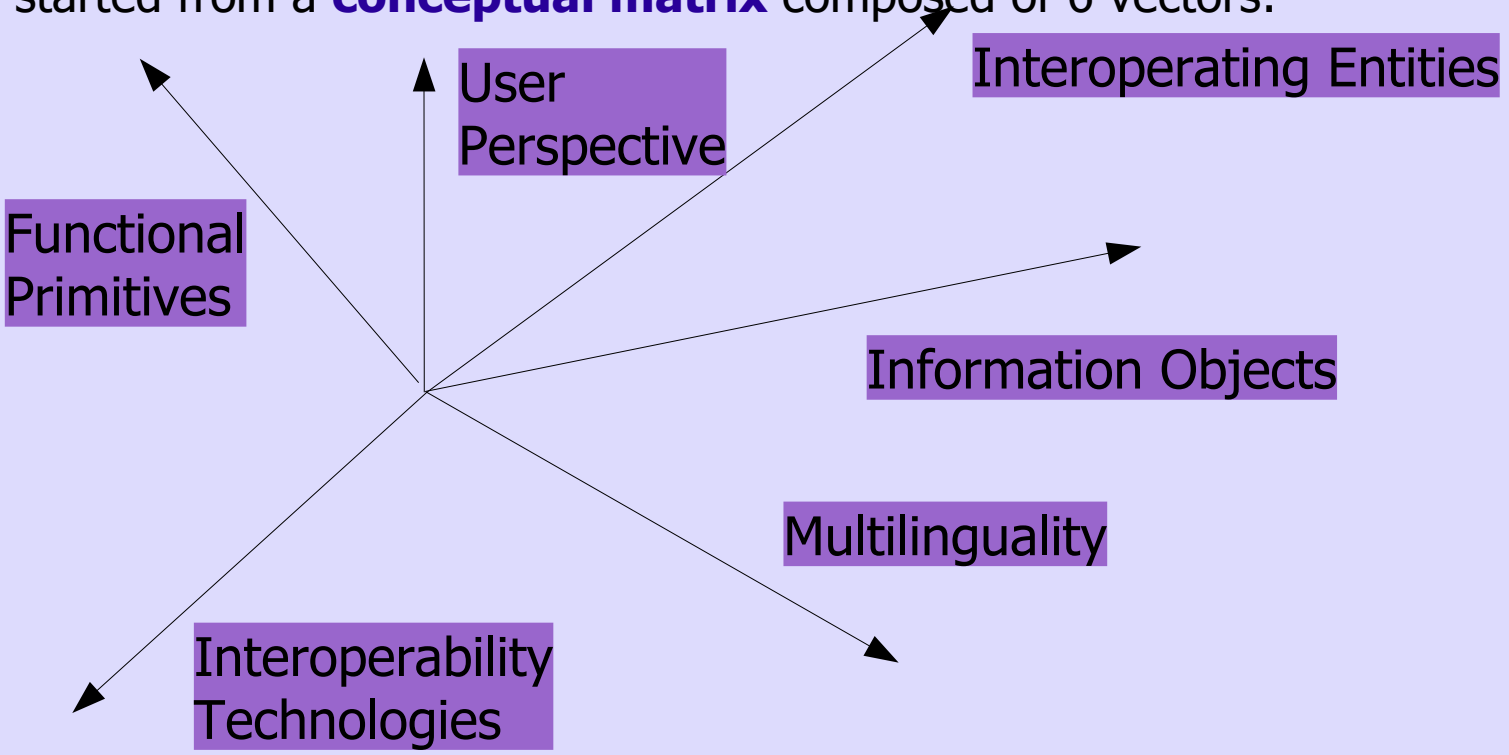
- EC i2010 agenda with Digital Libraries as one of 3 'flagship initiatives': the setting up of the **European Digital Library** as a common multilingual access point to Europe's distributed digital cultural heritage including all types of cultural heritage institutions
  - **2008**: at least 2 million digital objects; multilingual; searchable and usable; work towards including archives.
  - **2010**: at least 6 million digital objects; including also museums and private initiatives.
  - "I am **not** suggesting that the Commission creates a single library. I envisage a **network** of many digital libraries – in different institutions, across Europe." V. Reding (29 September 2005)
- WG active from January to June 2007 with a double mission:
  - Contribute to the **short term DL agenda** => identify areas for short term action and recommend elements of an action plan (**list of prioritised feasible options**)
  - Contribute to the **long term DL agenda** => identify key elements for a **long term strategy**

Working Group Composition

- Emmanuelle **Bermes** (Bibliothèque nationale de France / F),
- Mathieu **Le Brun** (Centre Virtuel de la Connaissance sur l'Europe / LU)
- Sally **Chambers** (The European Library Office / TEL),
- Robina **Clayphan** (The British Library / GB),
- Birte **Christensen-Dalsgaard** (State and University Library Aarhus / DK),
- David **Dawson** (The Museums, Libraries and Archives Council / GB),
- Stefan **Gradmann** (Hamburg University Computing Center / D),
- Stefanos **Kollias** (Technical University of Athens / GR),
- Maria Luisa **Sanchez** (Ministerio de Cultura / ES),
- Guus **Schreiber** (Vrije Universiteit Amsterdam / NL),
- Olivier **de Solan** (Direction des Archives de France / F)
- Theo **van Veen** (Koninklijke Bibliotheek / NL)
- *EC: Pat **Manson** Chair), Marius **Snyders** (European Commission, DG INFSO, Cultural Heritage and Technology Enhanced Learning) Federico **Milani** (European Commission, DG INFSO, eContentPlus)*

Conceptual Framework of Interoperability WG

- "Interoperability is the capability to **communicate**, **execute programs**, or **transfer data** among various **functional units** in a manner that requires **minimal knowledge** of the **unique characteristics** of those units."
- To identify more precisely the determining factors of interoperability we started from a **conceptual matrix** composed of 6 vectors:



Vector Details 1

- **Objects of Inter-Operation**
  - full content of digital information objects (analogue vs. born digital),
  - representations (librarian or other metadata sets),
  - surrogates,
  - functions,
  - Services
- **Functional Perspective of Interoperation**
  - Exchange and/or propagation of digital content (OA/Non OA)
  - Aggregation of objects into a common content layer (push vs. harvesting / pull)
  - interaction with multiple Digital Libraries via unified interfaces
  - operations across federated autonomous Digital Libraries (such as searching or meta-analysis for e. g. impact evaluation)
  - common service architecture and/or common service definitions or aim at building common portal services.

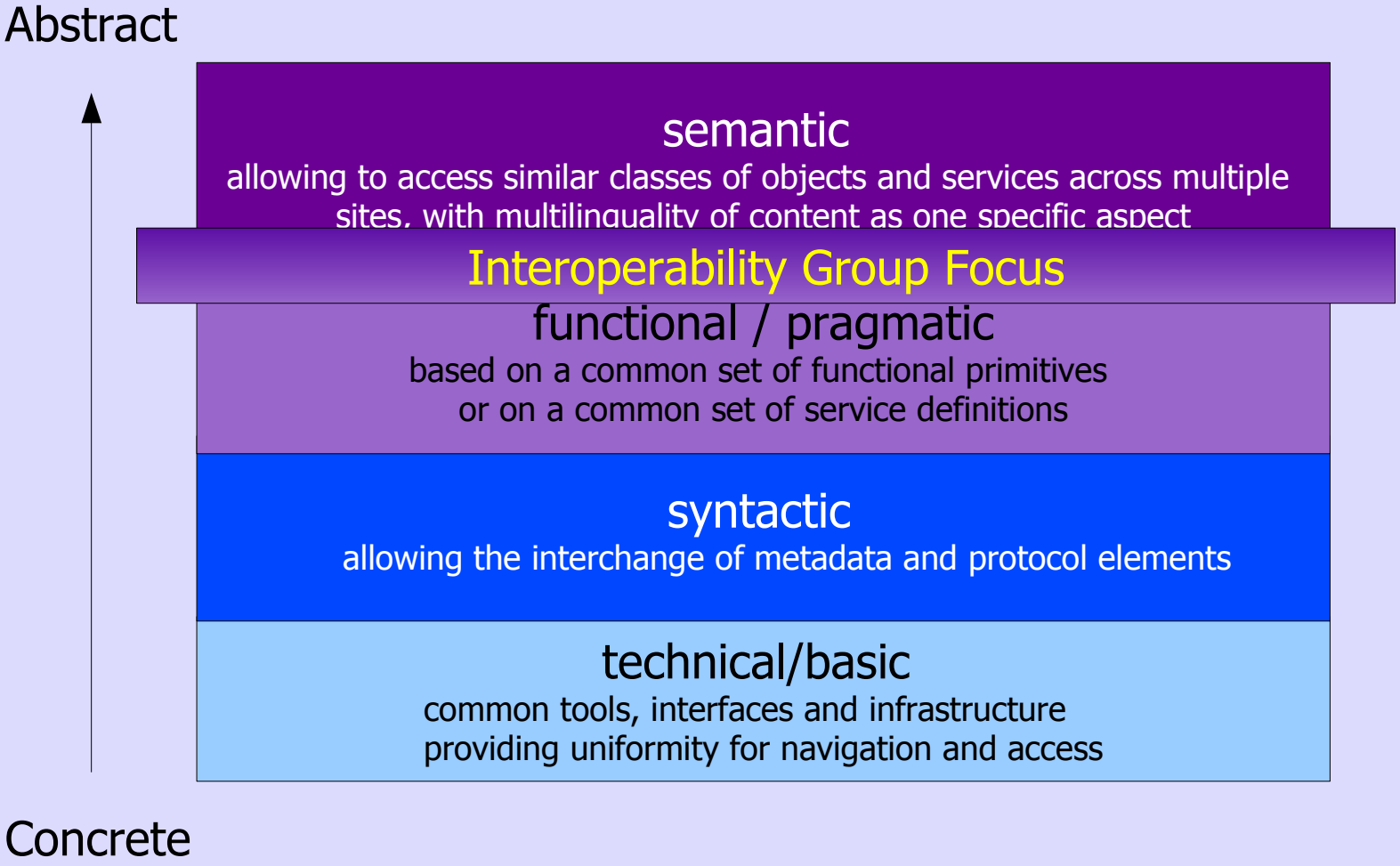
Vector Details 2

- **Interoperating Entities**
  - Cultural Heritage Institutions (libraries, museums, archives)
  - Digital Libraries,
  - Repositories (institutional and other),
  - eScience/eLearning platforms or simply
  - 'Services'
- **Multilinguality**
  - Multilingual / localised interfaces,
  - Multilingual Object Space (dynamic query translation, dynamic translation of metadata or dynamic localisation of digital content)

Vector Details 3

- **Design and Use Perspective**
  - manager,
  - administrator,
  - end user as consumer or
  - end user as provider of content,
  - content aggregator,
  - a meta user or a
  - policy maker.
- **Interoperability Enabling Technology**
  - Z39.50 / SRU+SRW
  - harvesting methods based on OAI-PMH
  - web service based approaches (SOAP/UDDI)
  - Java based API defined in JCR (JSR 170/283)

Interoperability Abstraction Levels



Interoperability Frameworks Discussed and EDL

- **DELOS** framework for DLs
- **5S** framework
- **DRIVER** repository federating architecture
- Object Reuse and Exchange **(ORE)**
- **JISC Information Environment** (SOA)
- **JCR** (Java API)
- Deliberately discarded a lot of others ...
- Both Short Term and Long Term Agenda Issues are input for EDLnet and the WP2 Working Groups and thus fed into the process of building **The European Digital Library**:
  - WG 2.1 Standards & Interoperability (Makx Dekkers)
  - WG 2.2 Semantic and Linguistic interoperability (Stefan Gradmann)
  - WG 2.3 Technical Interoperability (Carlo Meghini)
- Most EC WG members are participating in the EDLnet WGs

Short Term Agenda Issues for 2008 / 1

- (1) User Requirements

  Existing use cases in operation with TEL and the BNF 'maquette' to be used as input for a systematic and generalised process for identifying EuDL user requirements. *Taken up in EDLnet WP3*

- **(2) Object Models (granularity and structure)**

  Granularity and complexity of the digital information objects will be at the level of complete objects. E. g. 'Books' and 'Articles' (librarian), 'records' and 'files' (archival) and 'artefacts' (museum) objects. For the longer term this should be further refined to a model for granularity that can deal with intra-object reference structures. *This object model has evolved considerably within WG 2.2 and will be revisited!*

- **(3) Persistent Identifiers**

  It should be technically impossible to create new resources in EuDL without applying standard identifiers. Any of the known identifier frameworks (URN, DOI, ARK and others) may be used as long as they are applied systematically and the resolving mechanisms are transparent. The CENL European Resolution Infrastructure should be applied for resolving purposes and for identifier referral.

Short Term Agenda Issues for 2008 / 2

- **(4) Metadata / Packaging Standard (complex!)**
  - Domain-specific Dublin Core Application Profiles to be developed and based on existing descriptive metadata standards to provide object-level search and retrieval across digital collections from libraries, museums, archives, institutional repositories, (inter-)national portals and other cultural heritage organisations.
  - Each domain-specific Dublin Core Application Profile must include provision for rights metadata as well as some provision for technical metadata (at least the file format and the version of this format).
  - For the provision of collection level descriptive metadata existing collection description formats (e.g. Michael, TEL, Archival Grid etc.) should be harmonised for use in the EuDL.
  - A Metadata Registry for EuDL should be developed.

Short Term Agenda Issues for 2008 / 3

- **(4) Metadata / Packaging Standard (continued)**
  - A higher level interoperability application profile should not be created. Instead, semantic interoperability techniques should be employed to implement semantic mappings and the cross-searching of descriptive metadata.
  - Packaging standards such as METS, MPEG 21 (DIDL) or XFDU, that serve as "wrappers" for complex objects, should be considered as part of Issue 2 (Object Models).
  - Section 5.1 of the Minerva Technical Guidelines can be used as a starting point regarding file formats. The work being done on file formats as part of the Planets project also needs to be be considered.
  - *All this is subject to ongoing discussion in EDLnet WG 2.1*

Short Term Agenda Issues for 2008 / 4

- (5) Service Description Framework for Service Registry

  A service registry will be needed as part of EuDL; the JISC IESR re-pository could be a strong candidate as a starting point.
- **(6) Licensing Policies**

  All freely available content and metadata should fall under a suitable licence clearly specifying the respective rights and use conditions.
- (7) Authentication Data Exchange

  Shibboleth-enabled methods such as eduGAIN should be used as the standard solution for trust based exchange of authentication data within EuDL and towards the outside. A "What Federation Are You From" (WFAYF) service should thus be implemented as part of EuDL.

Short Term Agenda Issues for 2008 / 4

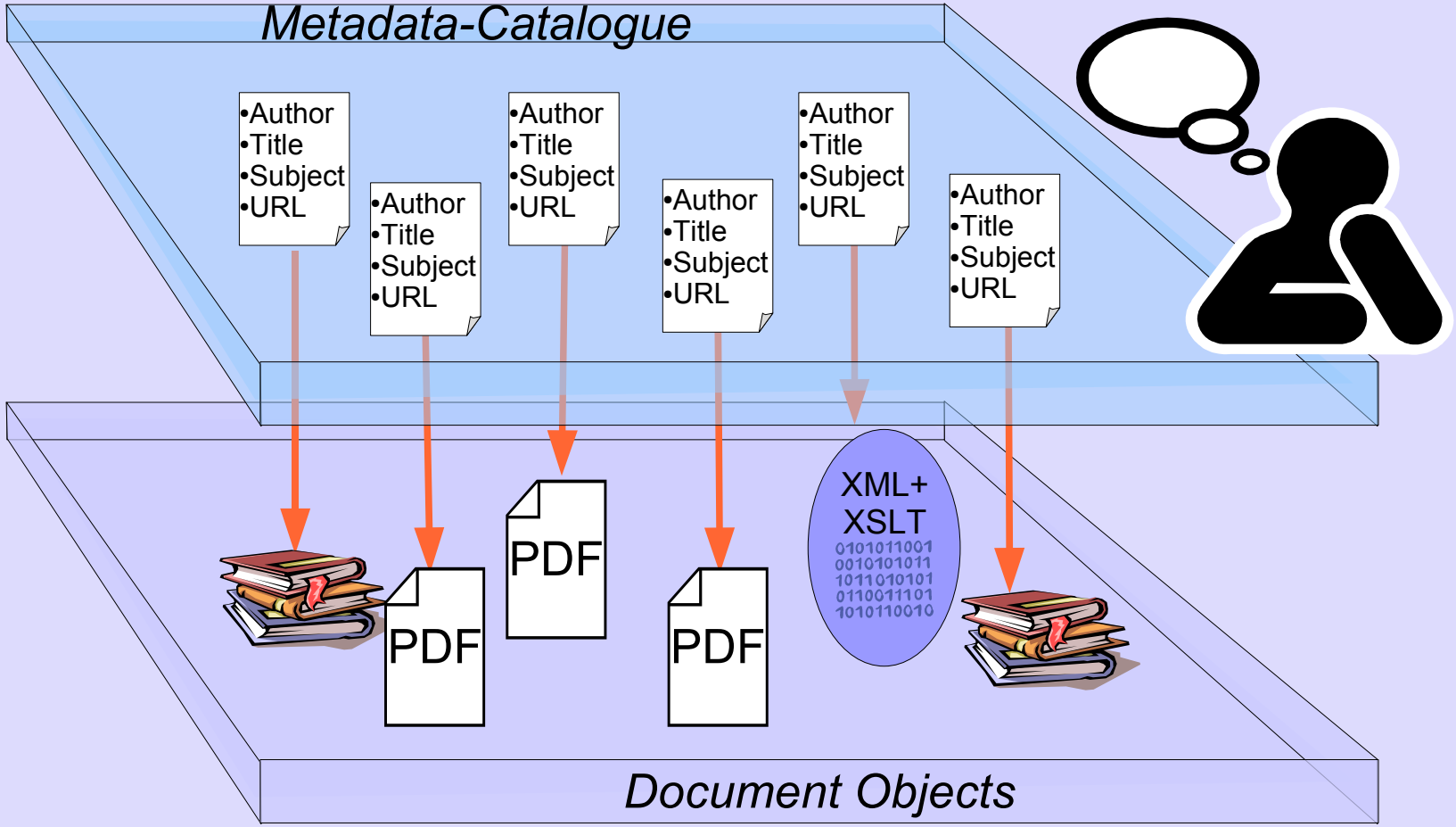
- **(8) Basic Semantic Interoperability**
  Make existing metadata and the controlled terminology used therein machine understandable to create a data layer ready for semantic query methods. The method of choice for conversion is SKOS, but use of OWL or RDF may be appropriate in some application scenarios.
- **(9) Awareness Building regarding Semantic Interoperability**
  Demonstrate the added value to be gained from semantic interoperability and the short term viability of converting existing controlled terminology in experimentation environments relevant to the EuDL. These environments also to be used to market semantic interoperability functions of EuDL as **our unique selling point**.
- (10) Interoperation of EUDL and WWW services (Google etc.)
  EuDL architecture should allow the creation of maximum exposure of services and content in generic WWW services (such as Google and Yahoo!) making sure the EuDL provenance is clearly identifiable.

Long Term Agenda Issues (2010 and beyond)

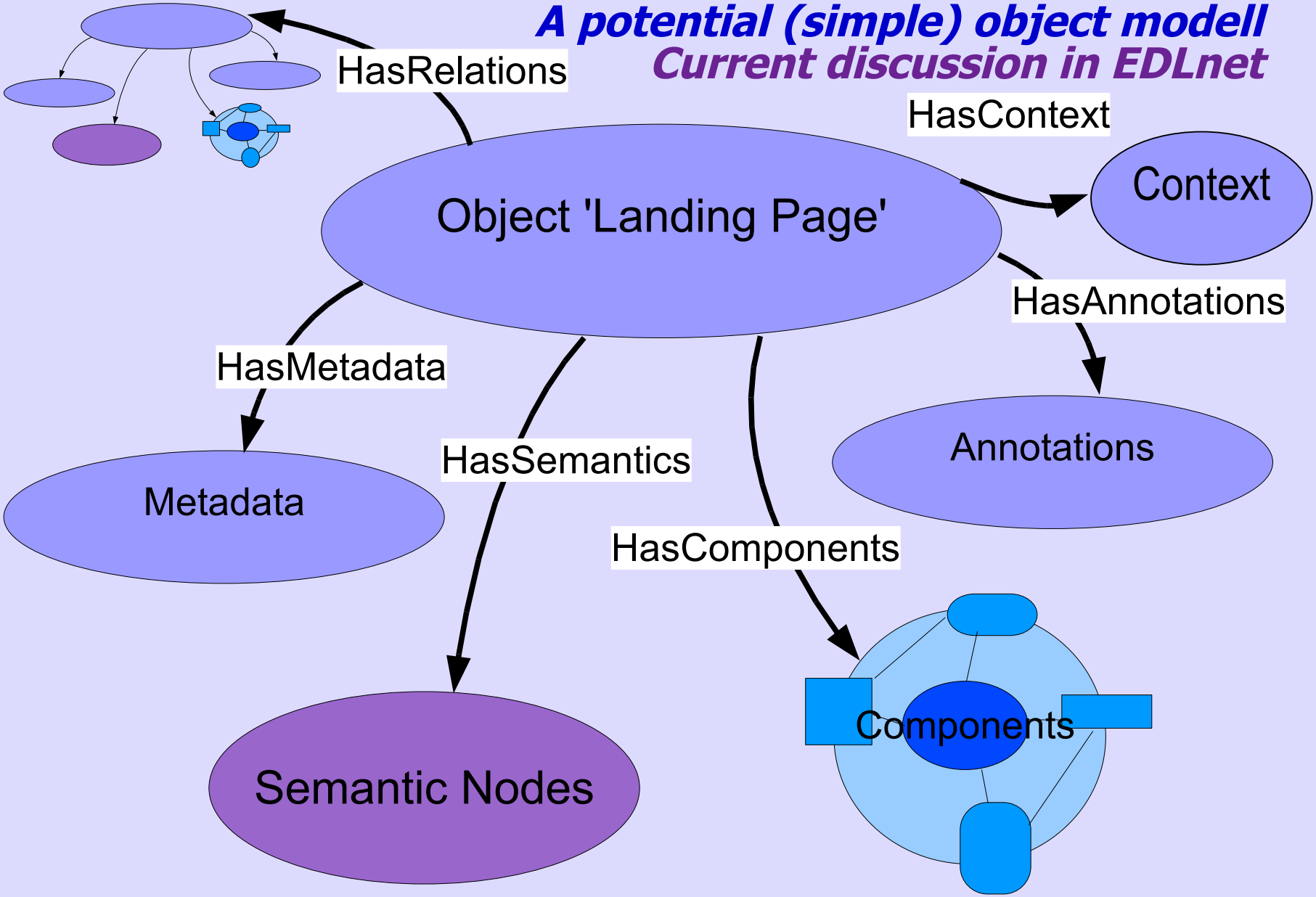
- **Object Modelling** (increase in Granularity and Complexity)
- Legal and **Access Protection** Issues (IPR / Rights / DRM)
- Advanced Semantic Interoperability (**Concepts / Ontologies / Rules / Reasoning**) and mapping to object modelling standards
- **Technical** and **Economical Sustainability**
- **Preservation Aspects**

- **Name Authority** Services
- **Multilingualism of Content**
- Identification of **Functional Primitives**
- **Service description** as a basis for service integration
- **Authorisation** (role models and role semantics),
- Usage **Logging**, **Accounting**, **Payment**
- Strategic goal of EuDL: to act rather as a **service provider** or as a **data/object provider**?

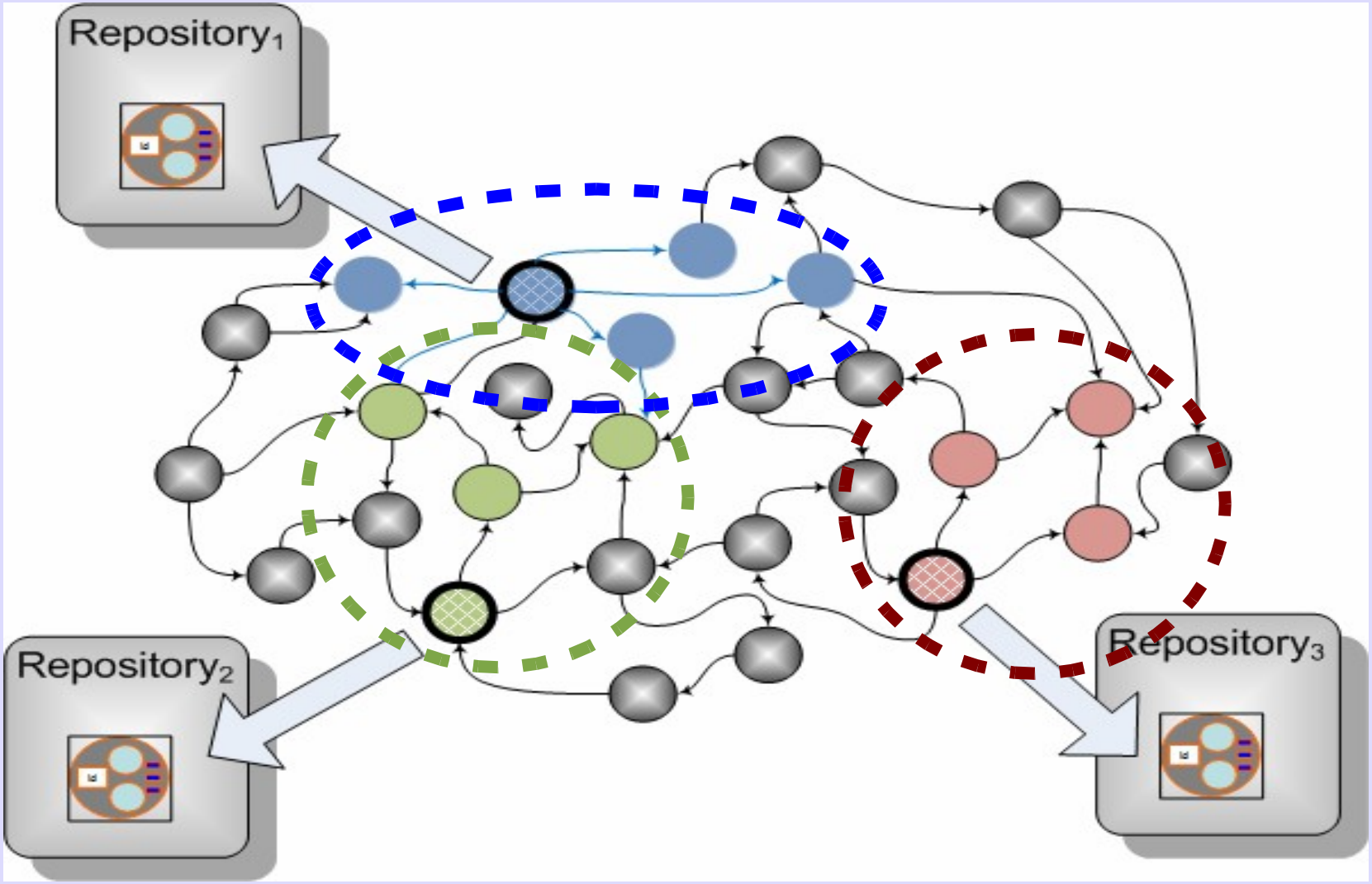
Metadata and Objects
In (digital) library catalogues



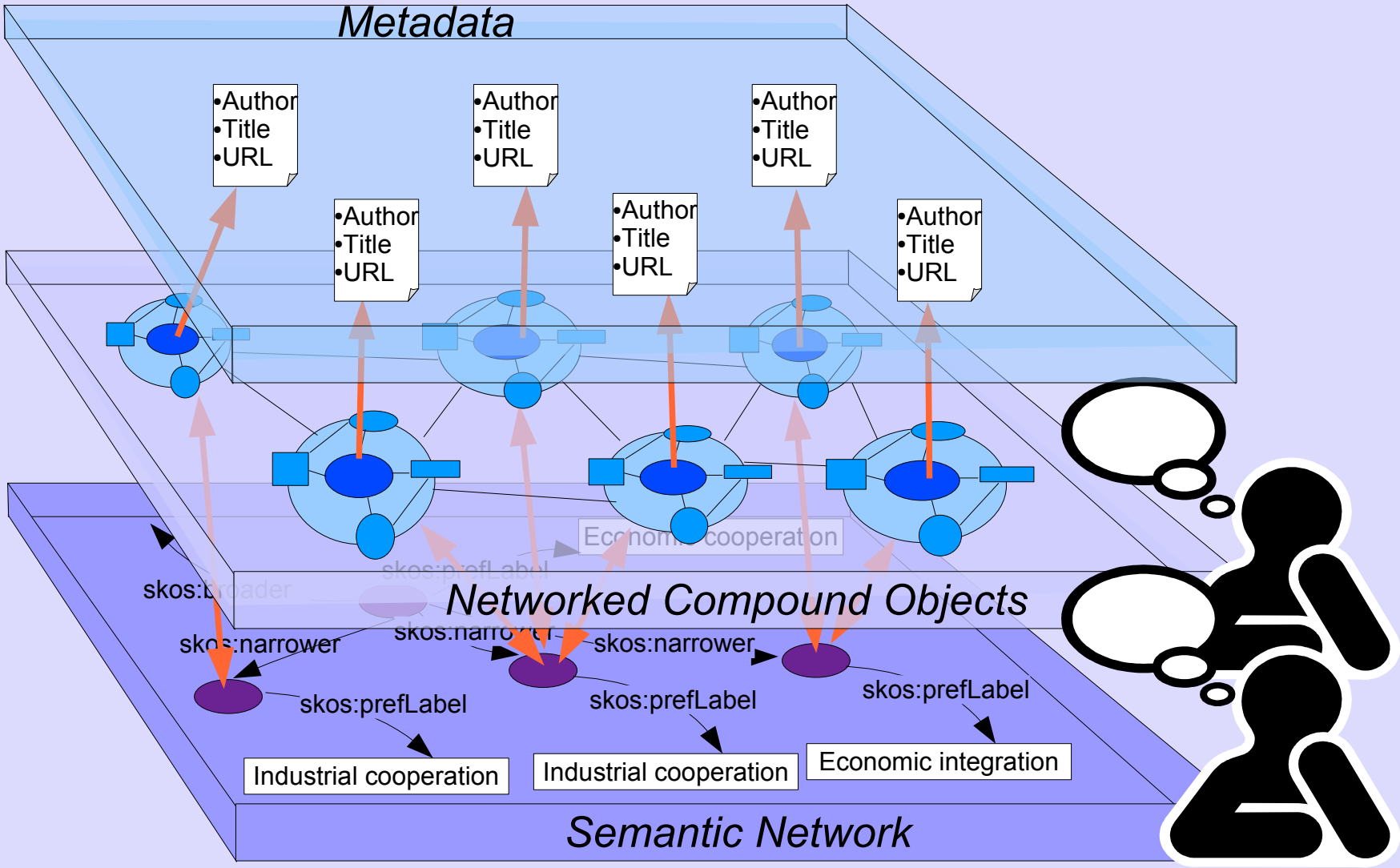
A potential (simple) object modell
Current discussion in EDLnet



A complementary and more granular model
Object Reuse and Exchange (ORE)



Document Objects, Metadata and Semantic Networks as part of future knowledge object networks



Status of Ongoing Work Within EDLnet

- Maquette
  - First draft of technical and functional specifications to be produced until 12/2007
  - Maquette building in 12/2007 and 01/2008
  - Presentation at EDLproject conference 1st of February 2008
- Prototype
  - Refinements of specifications for prototype development as a reaction to feedback of maquette in March/April 2008
  - Freezing point of prototype requirements by 04/2008 (?)
  - Prototype development from 02/2008 – 09/2008
  - Prototype testing in 09-10/2008 (?, with loopbacks to development for digesting feedback from testing)
  - 11/2008: presentation of prototype by commissioner Reding

Specific Constraints and Requirements for Digitisation

- Very few **specific ones**: the overall imperative is for digitised objects to **coexist**, **interoperate** and **functionally align** as much as possible with
  - Born digital objects
  - Complex compound objects
  - Non-librarian cultural artefacts and archival material
- This implies **new requirements** or puts particular stress on existing ones:
  - OCR as prerequisite for full text operations
  - Structure recognition to enable referencing
  - Semantically rich metadata wherever possible
  - Pointers from the object to metadata
  - Licensing information as art of object landing page
    - Thank you for patience and attention!